WHAT IS CLAIMED IS

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     1. A radio channel setting control method of controlling a radio channel used for communications between a base-station apparatus and a mobile-station apparatus in a mobile communications system employing a CDMA scheme including the base-station apparatus, mobile-station apparatus, and a radio network control apparatus controlling the base-station apparatus, comprising the steps of:

     a) determining whether or not a spread code used for the communications can be allocated;

     b) determining whether or not a predetermined hardware device can be allocated;

     c) determining whether or not a radio resource can be allocated;

     d) setting the radio channel between the base-station apparatus and mobile-station apparatus when it is determined that the spread code, predetermined hardware device and radio resource can be allocated.

     2. The method as claimed 1, wherein:

     a first uplink interference electric power which is the total of interference electric power directed to the base-station apparatus from the mobile-station apparatus is measured, and

     when the thus-obtained first uplink interference

electric power is equal to or smaller than a first threshold, it is determined that the radio resource can be allocated.

5

3.   The method as claimed in claim 2, wherein:
it is determined to allow allocation of a radio
10   resource for an uplink circuit directed to the base-station apparatus from the mobile-station apparatus when the first uplink interference electric power is equal to or smaller than the first threshold.

15

4.   The method as claimed in claim 1, wherein:
a first downlink transmission power which is the
20   total of transmission electric power directed to the mobile-station apparatus from the base-station apparatus is measured, and
when the thus-obtained first downlink transmission electric power is equal to or smaller than a
25   second threshold, it is determined to allow allocation of the radio resource.

30

5.   The method as claimed in claim 4, wherein:
when the first downlink transmission electric
power is equal to or smaller than the second threshold, it

is determined that a radio resource for a downlink circuit directed to the mobile-station apparatus from the base-station apparatus can be allocated.

5

6. The method as claimed in claim 4, wherein:

allocation allowableness/disallowableness of the
10 spread code used for the communications is determined by the radio network control apparatus;

the first uplink interference electric power and the first down-link transmission electric power are measured by the base-station apparatus;

15 based on the thus-obtained first uplink interference electric power and the first down-link transmission electric power, the allocation allowableness/disallowableness of the radio resource used for the communication is determined, and the allocation
20 allowableness/disallowableness of the predetermined hardware device in the base-station apparatus used for the communications is determined, by the base-station apparatus;

the determination results on the allocation
25 allowableness/disallowableness of the radio resource and predetermined hardware device are informed of to the radio network control apparatus; and

the radio network control apparatus sets the radio channel when each of all the determination results
30 on the allocation allowableness/disallowableness for the above-mentioned spread code, predetermined hardware device, and radio resource is affirmative.

7. The method as claimed in claim 4, wherein:

the allocation allowableness/disallowableness of the spread code used for the communications is determined by the radio network control apparatus;

5   the allocation allowableness/disallowableness of the predetermined hardware device in the base-station apparatus used for the communications is determined by the same;

the base-station apparatus measures the first

10   uplink interference electric power and the first downlink transmission electric power;

based on the thus-obtained first uplink interference electric power and first downlink transmission electric power, the allocation

15   allowableness/disallowableness of the radio resource used for the communications is determined by the base-station apparatus;

the determination result of the allocation allowableness/disallowableness of the radio resource is

20   informed to the radio network control apparatus; and

when each of all the determination results on the allocation allowableness/disallowableness of the spread code, predetermined hardware device, and the radio resource is affirmative, the radio channel between the

25   base-station apparatus and mobile-station apparatus is set by the radio network control apparatus.

30

8. The method as claimed in claim 4, wherein;

the allocation allowableness/disallowableness of the predetermined hardware device in the base-station

apparatus used for the communications is determined by the base-station apparatus;

the first uplink interference electric power and first downlink transmission electric power are measured by
5   the same;

the determination result of the allocation allowableness/disallowableness of the predetermined hardware device, and the first uplink interference electric power and first downlink which transmission
10   electric power measured are informed of to the radio network control apparatus;

the radio network control apparatus determines allocation allowableness/disallowableness of the spread code used for the communications;
15   based on the first uplink interference electric power and the first downlink transmission electric power informed of by the base-station apparatus, the radio network control apparatus determines allocation allowableness/disallowableness of the radio resource used
20   for the communications; and

the radio channel is set between the base-station apparatus and mobile-station apparatus by the radio network control apparatus, when each of all the determination results on the allocation
25   allowableness/disallowableness for the spread code, predetermined hardware device, and the radio resource is affirmative.

30

9. The method as claimed in claim 4, wherein;
allocation allowableness/disallowableness of the

spread code used for the communications is determined, and allocation allowableness/disallowableness of the predetermined hardware device in the base-station apparatus used for the communications is determined, by

5 the radio network control apparatus;

the first uplink interference electric power and first downlink transmission electric power are measured by the base-station apparatus; thus-obtained first uplink interference electric power and first downlink which

10 transmission electric power are informed of to radio network control apparatus;

based on the thus-obtained first uplink interference electric power and first downlink transmission electric power informed of by the base-

15 station apparatus, the radio network control apparatus determines allocation allowableness/disallowableness of the radio resource used for the communications; and

when each of all of the determination results on the allocation allowableness/disallowableness of the

20 spread code, predetermined hardware device, and radio resource is affirmative, the radio network control apparatus sets the radio channel between the base-station apparatus and the mobile-station apparatus.

25

10. The method as claimed in claim 1, wherein;

a second uplink interference electric power

30 directed to the base-station apparatus from the mobile-station apparatus newly occurring by the communications is derived;

the first uplink interference electric power

which is the total of interference electric power directed to the base-station apparatus from the mobile-station apparatus is measured;

the sum of the thus-obtained second uplink interference electric power and first uplink interference electric power is calculated; and

when the sum of the first uplink interference electric power and second uplink interference electric power is equal to or smaller than a third threshold, it is determined that allocation of the radio resource used for the communications is allowable.

11. The method as claimed in claim 10, wherein; when the sum of the first uplink interference electric power and the second uplink interference electric power is equal to or smaller than the third threshold, it is determined to allow allocation of a radio resource for an uplink circuit directed to the base-station apparatus from the mobile-station apparatus.

12. The method as claimed in claim 10, wherein; the second uplink interference electric power is derived for every classification of the communications.

13. The method as claimed in claim 10, wherein the second uplink interference electric power is derived at least based on the chip rate or the information transmission rate of the communications, the signal to

5   noise electric power ratio corresponding to the chip rate or the information transmission rate of the communications, and the uplink interference electric power.

10

14. The method as claimed in claim 1, wherein; a first downlink transmission electric power directed to the mobile-station apparatus from the base-

15   station apparatus is measured; a second downlink transmission electric power directed to the mobile-station apparatus from the base-station apparatus required for the communications is derived; and

20   it is determined to allow allocation of the radio resource used for the communications, when the sum of the first down-link transmission electric power and second down-link transmission electric power is equal to or smaller than a fourth threshold.

25

15. The method as claimed in claim 14, wherein;

30   when the calculated sum of the second down-link transmission electric power and first downlink transmission power is equal to or smaller than the fourth threshold, allocation of a radio resource for a down-link

circuit directed to the mobile-station apparatus from the
base-station apparatus is allowed.

5

16.   The method as claimed in claim 14, wherein:
the second downlink transmission electric power
is derived for every classification of the communications.

10

17.   The method as claimed in claim 14, wherein:
15   the second downlink transmission electric power
is derived based on at least one of a quality on a pilot
channel and reception electric power in the mobile-station
apparatus.

20

18.   The method as claimed 14, wherein;
the second downlink transmission electric power
25   is derived at least based on a ratio of a receiving energy
per one chip on a pilot channel to an interference
electric power in the mobile-station apparatus, a
spreading factor of a physical channel used for the
communications, a signal to noise electric power ratio
30   that the communications requires, and a transmission
electric power on the pilot channel in the base-station
apparatus.

19   The method as claimed in claim 14, wherein:

the radio network control apparatus determines allocation allowableness/disallowableness of the spread code used for the communications, derives at least one of

5 the second uplink interference electric power and second downlink transmission electric power;

in case the second uplink interference electric power is derived, the second uplink interference electric power is informed of to the base-station apparatus, and,

10 when the second downlink transmission electric power is derived, the second downlink transmission electric power is informed of to the base-station apparatus;

the base-station apparatus measures the first uplink interference electric power and first downlink

15 transmission power;

in case the second uplink interference electric power is transmitted by the radio network control apparatus, the base-station apparatus calculates a sum of the first uplink interference electric power and the

20 second uplink interference electric power, while, in case the second downlink transmission power was transmitted by the radio network control apparatus, the base-station apparatus calculates a sum of the first downlink transmission power and the second downlink transmission

25 power;

in case both the sum of the first uplink interference electric power and second uplink interference electric power and the sum of the first downlink transmission power and second downlink transmission power

30 are thus calculated,

based on these sums, allocation allowableness/disallowableness for the radio resource used for the communications is determined;

in case only the sum of the first uplink interference electric power and second uplink interference electric power is thus calculated, based thereon, allocation allowableness/disallowableness for the radio

5 resource used for the communications is determined;

in case only the sum of the first downlink transmission power and second downlink transmission power is thus calculated, based thereon, allocation allowableness/disallowableness for the radio resource used

10 for the communications is determined;

allocation allowableness/disallowableness for the predetermined hardware device in the base-station apparatus used for the communications is determined;

the thus-obtained determination results on the

15 allocation allowableness/disallowableness for the radio resource and hardware device are informed of to the radio network control apparatus; and

the radio network control apparatus sets the radio channel between the base-station apparatus and

20 mobile-station apparatus when each of all of the determination results on the allocation allowableness/disallowableness for the spread code, predetermined hardware device and radio resource is affirmative.

25

20. The method as claimed in claim 14, wherein:

30 the radio network control apparatus determines allocation allowableness/disallowableness for the spread code used for the communications, determines allocation allowableness/disallowableness for the predetermined

hardware device in the base-station apparatus used for the communications, and derives at least one of the second uplink interference electric power and second downlink transmission electric power;

5   in case the second uplink interference electric power is derived, the second uplink interference electric power is informed of the base-station apparatus, and, in case the second downlink transmission electric power is derived, the second downlink transmission electric power

10   is informed of to the base-station apparatus;

      the base-station apparatus measures the first uplink interference electric power and first downlink transmission power;

      in case the second uplink interference electric

15   power is transmitted by the radio network control apparatus, the base-station apparatus calculates a sum of the first uplink interference electric power and the second uplink interference electric power, and, in case the second downlink transmission power is transmitted by

20   the radio network control apparatus, the base-station apparatus calculates a sum of the first downlink transmission power and the second downlink transmission power;

      in case both the sum of the first uplink

25   interference electric power and second uplink interference electric power and the sum of the first downlink transmission power and second downlink transmission power are calculated,

      based on these sums, allocation

30   allowableness/disallowableness for the radio resource used for the communications is determined;

      in case only the sum of the first uplink interference electric power and second uplink interference

electric power is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

     in case only the sum of the first downlink
5   transmission power and second downlink transmission power
is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

     the thus-obtained determination result is
10 informed of to the radio network control apparatus; and

     the radio network control apparatus sets the
radio channel between the base-station apparatus and
mobile-station apparatus when each of all of the
determination results on the allocation
15 allowableness/disallowableness for the spread code,
predetermined hardware device and radio resource is
affirmative.

20

     21. The method as claimed in claim 14, wherein;

     the base-station apparatus determines allocation
allowableness/disallowableness for the predetermined
25 hardware device in the base-station apparatus used for the
communications, and measures the first uplink interference
electric power and first downlink transmission power;

     the determination result on the allocation
allowableness/disallowableness for the predetermined
30 hardware device, and the measured first uplink
interference electric power and first downlink
transmission power are informed of to the radio network
control apparatus;

the radio network control apparatus determines
allocation allowableness/disallowableness for the spread
code used for the communications, and derives at least one
of the second uplink interference electric power and

5   second downlink transmission electric power;

in case the second uplink interference electric
power is derived, a sum of the first uplink interference
electric power and the second uplink interference electric
power is calculated, and, in case the second downlink

10   transmission electric power is derived, a sum of the first
downlink transmission power and the second downlink
transmission electric power is calculated;

in case both the sum of the first uplink
interference electric power and second uplink interference

15   electric power and the sum of the first downlink
transmission power and second downlink transmission power
are calculated, based on these sums, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

20   in case only the sum of the first uplink
interference electric power and second uplink interference
electric power is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

25   in case only the sum of the first downlink
transmission power and second downlink transmission power
is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

30   the radio network control apparatus sets the
radio channel between the base-station apparatus and
mobile-station apparatus when each of all of the
determination results on the allocation

allowableness/disallowableness for the spread code, predetermined hardware device and radio resource is affirmative.

5

     22. The method as claimed in claim 14, wherein:

10   the radio network control apparatus determines allocation allowableness/disallowableness for the spread code used for the communications, determines allocation allowableness/disallowableness for the predetermined hardware device in the base-station apparatus used for the

15 communications, and derives at least one of the second uplink interference electric power and second downlink transmission electric power;

     the base-station apparatus measures the first uplink interference electric power and first downlink

20 transmission power, which are then informed of to the radio network control apparatus;

     in case the second uplink interference electric power is derived, a sum of the first uplink interference electric power and the second uplink interference electric

25 power is calculated, and in case the second downlink transmission electric power is derived, a sum of the first downlink transmission power and the second downlink transmission electric power is calculated;

     in case both the sum of the first uplink

30 interference electric power and second uplink interference electric power and the sum of the first downlink transmission power and second downlink transmission power are calculated, based on these sums, allocation

allowableness/disallowableness for the radio resource used
for the communications is determined;

   in case only the sum of the first uplink
interference electric power and second uplink interference
5   electric power is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined;

   in case only the sum of the first downlink
transmission power and second downlink transmission power
10   is calculated, based thereon, allocation
allowableness/disallowableness for the radio resource used
for the communications is determined; and

   the radio network control apparatus sets the
radio channel between the base-station apparatus and
15   mobile-station apparatus when each of all of the
determination results on the allocation
allowableness/disallowableness for the spread code,
predetermined hardware device and radio resource is
affirmative.

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   23.   A radio network control apparatus
controlling communications between a subordinate base-
station apparatus and a mobile-station apparatus in a
mobile communications system employing a CDMA scheme,
30   comprising:

   a determination obtaining part obtaining a
determination result as to whether or not a spread code
used for the communications, a predetermined hardware

device in the base-station apparatus and a radio resource can be allocated; and

a radio channel setting part setting up a radio channel between the base-station apparatus and the mobile-station apparatus when the spread code, predetermined hardware device and radio resource can be allocated.

10

24. The radio network control apparatus as claimed in claim 23, further comprising:

a spread code allocation allowableness/disallowableness determining part determining allocation allowableness/disallowableness for the spread code.

20

25. The radio network control apparatus as claimed in claim 23, further comprising;

a spread code allocation allowableness/disallowableness determining result receiving part receiving a determination result on allocation allowableness/disallowableness for the spread code from the base-station apparatus.

30

26. The radio network control apparatus as claimed in claim 23, further comprising:

a hardware device allocation allowableness/disallowableness determining part determining allocation allowableness/disallowableness for the predetermined hardware device.

5

27. The radio network control apparatus as

10 claimed in claim 23, further comprising:

a hardware device allocation allowableness/disallowableness determining result receiving part receiving a determination result on allocation allowableness/disallowableness for the

15 predetermined hardware device from the base-station apparatus.

20

28. The radio network control apparatus as claimed in claim 23, further comprising:

a radio resource allocation allowableness/disallowableness determining part

25 determining allocation allowableness/disallowableness for the radio resource.

30

29. The radio network control apparatus as claimed in claim 23, further comprising:

a radio resource allocation

allowableness/disallowableness determining result
receiving part receiving a determination result on
allocation allowableness/disallowableness for the radio
resource from the base-station apparatus.

5

30.   The radio network control apparatus as
10   claimed in claim 28, wherein:
the radio resource allocation
allowableness/disallowableness determining part determines
that allocation of the radio resource is possible when a
first uplink interference electric power which is the
15   total of interference electric power directed to the base-
station apparatus from the mobile-station apparatus is
equal to or smaller than a first threshold.

20

31.   The radio network control apparatus as
claimed in claim 30, wherein:
the radio resource allocation
25   allowableness/disallowableness determining part
determining that allocation of a radio resource for an
uplink circuit directed to the base-station apparatus from
the mobile-station apparatus is possible when the first
uplink interference electric power is equal to or smaller
30   than of the first threshold.

32. The radio network control apparatus as
claimed in claim 28, wherein:

the radio resource allocation
allowableness/disallowableness determining part determines
that the radio resource can be allocated when a first
downlink transmission electric power which is the total of
transmission electric power directed to the mobile-station
apparatus from the base-station apparatus is equal to or
smaller than a second threshold.

33. The radio network control apparatus as
claimed in claim 32, wherein:

the radio resource allocation
allowableness/disallowableness determining part determines
that a radio resource for a downlink circuit directed to
the mobile-station apparatus from base-station apparatus
when the first downlink transmission electric power is
equal to or smaller than the second threshold.

34. The radio network control apparatus as
claimed in claim 28, wherein:

the radio resource allocation
allowableness/disallowableness determining part determines
that the radio resource can be allocated when a sum of a
first uplink interference electric power which is a total
of interference electric power directed to the base-
station apparatus from the mobile-station apparatus, and a

second uplink interference electric power directed to the base-station apparatus from the mobile-station apparatus newly occurring by the communications is equal to or smaller than a third threshold.

5

35. The radio network control apparatus as
10 claimed in claim 34, wherein:
the radio resource allocation allowableness/disallowableness determining part determines that allocation of a radio resource for a uplink circuit directed to the base-station apparatus from the mobile-
15 station apparatus is possible when the sum of the uplink interference electric power and the second uplink interference electric power is equal to or smaller than the third threshold.

20

36. The radio network control apparatus as
clamed in claim 28, wherein:
25 the radio resource allocation allowableness/disallowableness determining part determines that allocation of the radio resource used for the communications is possible when a sum of a first downlink transmission electric power which is a total of
30 transmission electric power directed to the mobile-station apparatus from the base-station apparatus, and a second downlink transmission electric power directed to the mobile-station apparatus from the transmission electric

power required for the communications is equal to or
smaller than a fourth threshold.

5

    37. The radio network control apparatus as
claimed in claim 36, wherein:
    the radio resource allocation
10 allowableness/disallowableness determining part determines
that allocation of a radio resource for a downlink circuit
directed to the mobile-station apparatus from the base-
station apparatus when the sum of the first downlink
transmission electric power and second downlink electric
15 power is equal to or smaller than the fourth threshold.

20   38. A base-station apparatus performing
communications with a mobile-station apparatus under
control of a mobile network control apparatus in a mobile
communications system employing a CDMA scheme, comprising:
    an allocation allowableness/disallowableness
25 determining part determining whether allocation of at
least any one a spread code used for the communications, a
predetermined hardware device in the base-station
apparatus and a radio resource is possible; and
    a determination result transmitting part
30 transmitting a determination result of the allocation
allowableness/disallowableness determining part,
    wherein allocation of a radio channel between
the base-station apparatus and mobile-station apparatus is

allowed when the spread code, predetermined hardware
device and radio resource can be allocated.

5

39. A mobile communications system comprising a
base-station apparatus, a mobile-station apparatus and a
radio network control apparatus controlling the base-
10   station apparatus, employing a CDMA scheme, wherein:
at least any of the base-station apparatus and
radio network control apparatus comprises:
a spread code allocation
allowableness/disallowableness determining part
15   determination whether or not a spread code used for the
communications between the base-station apparatus and
mobile-station apparatus can be allocated;
a hardware device allocation
allowableness/disallowableness determining part
20   determination whether or not a predetermined hardware
device in the base-station apparatus used for the
communications can be allocated;
·a radio resource allocation
allowableness/disallowableness determining part
25   determination whether or not a radio resource used for the
communications can be allocated; and
a radio channel setting part setting a radio
channel between the base-station apparatus and mobile-
station apparatus when the spread code, predetermined
30   hardware device and radio resource can be allocated.